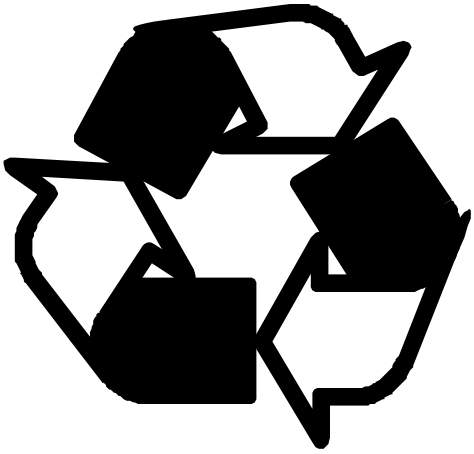
ECONOMIC DIRECTORATE

CURRENT SURVEYS

CHANGE CONTROL MODEL



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ECONOMIC DIRECTORATE CURRENT SURVEYS
CHANGE CONTROL MODEL

A. INTRODUCTION

A standard Change Control process will be implemented for the Current Surveys in the Economic Directorate to assist managers, system developers and end users in controlling changes to system software. A change control process will ensure that:

- System integrity is maintained
- Only authorized changes are made
- Software changes are tested thoroughly
- Correct versions of software releases are maintained
- All individuals affected by software changes are notified

A standard change control process will also aid in identifying and tracking the resources used to update the software. This includes the resources needed to design and code the change, as well as those resources required to update the specifications, test the changes, update the documentation, and provide training.

All systems currently used to process current surveys in the Economic Directorate must adhere to the following standards when developing and maintaining system software. Change control processes may incorporate system-specific standards as long as they include the minimum requirements outlined in the model described below.

Individual change control processes will be written for each of the existing systems in the Directorate and will be included as supplements to this document.

B. ASSUMPTIONS

1. All current survey processing systems in the Economic Directorate must use the Change Control model outlined in this document. Change Control processes for the various systems in the Directorate may include additional processes or tasks specific to their systems. At a minimum, the requirements outlined below, must be met.

2. The Change Control process is to be used for "existing" processing systems in the Economic Directorate. It is not required for the development of new systems.

3. There will be an individual or staff designated as the "Change Control Coordinator". The Change Control coordinator will be responsible for receiving, processing, and tracking all change control requests from initial receipt to completion.

4. There will be an individual or staff in place acting as an authority to accept or reject software change requests.

5. There will be 2 tracking systems in place. These may be electronic or manual. The first will be the "Change Control " tracking system which will track all change requests from receipt to completion. The second will be the "Software Code" tracking system which will track all code changes from approval through release.

6. Software changes will be grouped into "releases". Larger processing systems may group multiple change requests into one release to production.

C. CHANGE CONTROL PROCESS

The Change Control Process will consist of 6 parts:

1.	Change Request	Means by which users may request additional system requirements, enhancements, or fixes.
2.	Change Assessment	Process to evaluate and determine whether or not a change request will be approved.
3.	Change Approval	Process by which a change request is approved and scheduled for implementation.
4.	Software Development	The design and/or coding of the software needed to implement the requested change.
5.	Software Testing	Process by which the software change is validated to ensure that the code produces the desired results and does not adversely affect other parts of the system.
6.	Software Release	Process in which the newly developed code is copied to production and the change communicated to the system users.

See Attachment A for a high level flowchart depicting the Change Control process.

1. CHANGE REQUEST

The "Change Request" is a means for users to request additional system requirements, enhancements, or fixes. An *additional requirement* refers to brand new system functionality that did not previously exist; *enhancements* are changes to existing programs to make the system more efficient or user-friendly; and *fixes* are changes to existing code that does not perform per specification.

To initiate a change request, users will submit a change request form (see Attachment B, "Sample Change Request Form") to the Change Control coordinator. The Change Control coordinator may be an individual or group.

Requirements for the "Change Request" process include the following:

1.1 There must be a standard manner in which change requests are submitted. This may be via electronic means or a paper form. (See Attachment B, Sample Change Request Form.)

1.2 Change requests must be submitted to a designated person or staff (i.e., change coordinator) that will review the change request and consult with designated individuals to determine if the request will be considered for approval. (See Section 2, "Change Assessment".)

1.3 Change requests will fall into one of the following categories:

a. Additional requirement
b. Enhancement
c. Fix

- **S** Normal
- **S** Emergency

1.4 At a minimum, the following information must be provided when a change request is submitted.

a. Date of request
b. Name of user requesting the change
c. Branch requesting the change
d. Type of change:

1. Additional requirement
2. Enhancement
3. Fix

e. Module or part of system affected by the change
f. Priority of the change:

1. Emergency/critical

2. High
3. Medium
4. Low

g. Date the change is needed
h. Detailed description of the change
i. Justification/benefit of the change

Individual areas may determine that additional information is required and are free to design their own change request forms, provided the minimum information described above, is included.

2. CHANGE ASSESSMENT

The Change Control coordinator will determine whether the change request is procedural or training-related, or if a change to the software is needed. If the change is procedural or training-related, the Change Control coordinator will refer the request to the appropriate person or staff.

If the change request requires a change to the software, the coordinator will perform an assessment to determine whether or not it should be implemented. Factors to be considered include the scope, benefits, resources and implications of the change.

Requirements for the "Change Assessment" process include the following:

2.1 The Change Control coordinator will ensure that a control number is assigned to the change request. (Each change request must be tracked from initial receipt to completion.)

2.2 The Change Control coordinator will determine the type of change requested:

a. Additional requirement
b. Enhancement
c. Fix - emergency/normal

It is possible that the Change Control coordinator may determine that the request is not a software change. Resolution of the request may simply mean that a procedural change or training is needed.

2.3 The Change Control coordinator will consult with designated individuals from the subject matter areas and/or programming staff to determine the:

a. Expected benefits of the change

b. Various components of the system affected by the change (i.e., performance, other modules, other users)

c. Resources needed to:

1. Create/update the specifications to reflect the change
2. Design and code the change
3. Test the change
4. Update any user documentation (e.g., user manual, on-line help)
5. Provide training

d. Length of time to implement the change

This information will be compiled using a Change Assessment form. (See Attachment C, "Sample Change Assessment Form".) Individual areas may create their own change assessment forms, provided they include the minimum information listed in 2.3 above.

3. CHANGE APPROVAL

The Change Control coordinator will present the findings from the Change Assessment process to the 'approving official'. This 'approving official' can be an individual or staff. It is possible that the Change Control coordinator is also the designated 'approving official'. Whoever has been assigned will be responsible for evaluating the completed Change Assessment form and determining whether or not the change will be implemented.

Requirements for the "Change Approval" process include the following:

3.1 The Change Control coordinator will present the findings from 2.3 above to the approving official (individual or staff). (Note: Individual areas may choose to assign the Change Control coordinator as the 'approving official'. If this is the case, the coordinator will simply evaluate the findings to determine whether the change should be approved.)

3.2 If the change is approved, the change coordinator will meet with individuals from the subject matter areas and/or programming staff to determine the:

a. Priority for the change (compared with other work currently scheduled)
b. Expected implementation date

3.3 If the change is not approved, the change coordinator will:

a. Close out the change request, and
b. Inform the requestor(s) as to why the change was not approved.

4. SOFTWARE DEVELOPMENT

When a change request has been approved and prioritized by the Change Control coordinator, it will be referred to the appropriate division or branch for implementation.

Requirements for "Software Development" include the following:

4.1 The subject matter area or processing area will write/update the software specification(s) for the change.

4.2 The program manager will assign the design and/or code change (for each task associated with the change request) to a programmer. (Note: A single change request could generate multiple programs/tasks.)

Each *task* must be tracked using a "software tracking" system. This system may be electronic or manual. The purpose of the tracking system is to monitor the code change from approval to release. The program manager will assign a 'program change number' to each task for tracking purposes. This number must be linked to the 'change control number'.

4.3 If existing code is being updated, the programmer must retain a back up file by copying the code to a designated directory.

4.4 The programmer will design and/or code the change. All changes to code must be documented in the program itself. At a minimum, the programmer must include a comment at the top of the program indicating why the code was developed or changed, the programmer's name, and the date that the code was created or updated. If a program is updated, the programmer must also include (as a comment) his initials and date on each line of the program in which code was changed. This will ensure that any programmer can determine at any point in time, why a program was changed, who changed it, and the date that it was changed.

4.5 The programmer must make every effort to complete the code change, (allowing time for testing), by the implementation date specified by the Change Control coordinator. If problems arise or the implementation date cannot be met, the programmer is responsible for notifying the Change Control coordinator.

In turn, the Change Control coordinator must communicate any delay in implementation to the users.

4.6 The programmer that codes the change must test the change prior to releasing the code to an independent tester.

5. SOFTWARE TESTING

After the software change has been coded, it must be tested to ensure that it performs as specified, and that it does not adversely affect other components of the system.

There are 3 types of testing that must be performed:

- Development test
- User acceptance test
- Production test

Software testing requirements include the following:

5.1 There must be a Test coordinator. This may or may not be the same individual or staff that serves as the Change Control coordinator.

5.2 Three types of testing must be performed: Development test, user acceptance test, and production test.

5.2.1 Development test

There are 2 parts to the Development Test: (1) Developer test and (2) Independent test.

Developer Test

The programmer who coded the change must test the code to verify that it performs per specifications. Once approved, he must notify the designated independent tester that the code is available for further testing.

Independent Test

An individual (or group), other than the programmer who coded the change, must also test the software. The independent tester could be the individual who wrote the specification for the code change or a person or persons assigned to a testing staff, solely responsible for testing system software changes. This individual (or group) must verify that the code performs per specifications.

5.2.2 User Acceptance Test

Once the independent tester has approved the code, he must notify the Test coordinator. The Test coordinator will then identify (with input from the subject matter and programming staffs) which users will be responsible for testing. At a minimum, the individual who requested the change will be responsible for testing it.

User acceptance testing should be performed on a machine or in an area separate from the development test area used by the programmers and independent testers.

Once the change is approved by the users, they must notify the Test coordinator.

5.2.3 Production test

The Test coordinator will request that the designated programmer copy the code to the production machine.

The Test coordinator will assign staff to perform minimum testing to verify that the code is working properly on the production machine.

5.3 Errors detected during the various testing stages must be documented using a standard format. (See Attachment D, "Sample Testing Form".) At a minimum, the following information must be included:

a. Change control number
b. Program change number
c. Brief description of change
d. Name of programmer that coded the change
e. Name of tester
f. Test start date
g. Test completion date
h. Detailed list of any errors detected
i. Classification of change (1 - Error, 2 - Additional requirement, 3 - Enhancement)

5.4 When the programmer receives the list of changes/errors from the tester, they must document which changes were made and which were not. If a change was not made, the reason must be stated (i.e., not feasible, not part of original requirements).

5.5 The various stages of testing must be recorded in the "Software Tracking" system. The following information must be recorded for each phase of testing:

a. Change control number
b. Program change number
c. Description of change
d. Test start date
e. Test deadline
f. Test completion date
g. Name of individuals assigned to test
h. Initials of tester(s) who approves a change

5.6 Benchmarks (to be determined by subject matter analysts, programmers, and math stats) must be run on all (or logical groups of) surveys.

6. SOFTWARE RELEASE

When the code change has been tested and approved by the users, the new code will be copied by a designated programmer to the production machine. At this time, all users must be notified of the change and all related documentation updated.

Requirements for the "Software Release" process include the following:

6.1 The Change Control coordinator will assign the change to a "release". Changes may be grouped together and 'released' (copied to production) at one time.

6.2 A designated programmer will copy the newly developed code from the development area to production.

6.3 The Change Control coordinator will notify the users that the code has been copied to production.

This notification will be in the form of a "Release Summary", and will include the following information:

a. Release number
b. Release date
c. Change request control number
d. Type of change
e. Description of the change
f. The module or components of the system affected by the change

6.4 The Change Control coordinator will consult with appropriate persons to verify that all documentation related to the change has been updated (e.g., specifications, user manual, systems manual, on-line help).

6.5 The Change Control coordinator will consult with appropriate persons to ensure that training (for the newly released code) is provided, when necessary.

6.6 The Change Control coordinator will close the ticket to record that the change request has been completed.

D. EMERGENCY VERSIONS OF SOFTWARE

It is known that emergency versions of the software may be needed in rare instances. Individual areas are responsible for developing procedures to create and maintain such software versions.

Attachment B

SAMPLE CHANGE REQUEST FORM

CHANGE REQUEST

Date: _____ Survey: _____
Name of requestor: _____ Phone: _____
Division/branch: _____ Bldg/room #: _____
Date change needed: _____

Type of Change:

1. Emergency fix
2. Normal fix
3. Additional requirement
4. Enhancement

Priority:

❍ Emergency/critical
❍ High
❍ Medium
❍ Low

Modules/parts of system affected: _____

Detailed description of change (include justification)

For processing use only:

Control #: _____ Date received: _____
Date resolved: _____

Resolution: _____
_____
_____
_____

Attachment C

SAMPLE CHANGE ASSESSMENT FORM

CHANGE ASSESSMENT

Change Control #: _____
Name of Assessor: _____ Date: _____

Description of change:

Benefits:

Resources (include specs, development, testing, documentation, etc.):

Supports Economic Directorate goal(s)? ___ Yes ___ No

Implications of change on other parts (modules) of system:

Implications of change to other surveys (if more than one survey processed on system):

Length of time to implement:

APPROVAL:

❑ APPROVE ❑ DISAPPROVE ❑ REFERRED TO: _____

Comments: _____
_____
_____
_____

Approver's Name: _____ Date: _____

Attachment D

SAMPLE TESTING FORM

Change control #: _____
Program change # _____
Description of change:

Programmer: _____
Tester: _____
Test start date: _____
Test completion date: _____

NO.	TESTER		PROGRAMMER	
	Description of Error/Change	Change Code	Completed ✓	Comments
1				
2				
3				
4				
5				
6				
7				
8				